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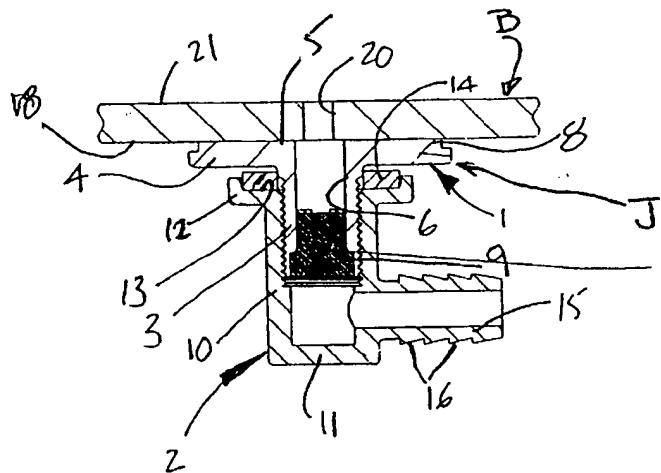
(71) Demandeur/Applicant:
C.G. AIR SYSTEMES INC., CA

(72) Inventeur/Inventor:
CASTELLOTE, MIGUEL, CA

(74) Agent: SWABEY OGILVY RENAULT

(54) Titre : JET D'AIR DISSIMULE AVEC MECANISME DE DEBIT UNIDIRECTIONNEL ET SYSTEME DE MASSAGE
D'AIR COMPRENANT AU MOINS UN DE CES JETS

(54) Title: HIDDEN AIR JET WITH UNIDIRECTIONAL FLOW MECHANISM AND AIR MASSAGE SYSTEM INCLUDING
AT LEAST ONE OF THESE JETS



(57) Abrégé/Abstract:

An air jet of an air massage system used with a bathtub having a wall defining opposite visible and hidden surfaces and defining a number of openings through the bathtub wall. The air jet comprises a hollow body having opposed inlet and outlet ends and a unidirectional flow device disposed therebetween. The outlet end is mounted directly to the hidden surface of the bathtub wall opposite one of the openings. The inlet end is connected to a source of pressurized air. The unidirectional flow device allows pressurized air therethrough only in a direction from the inlet to the outlet end and then through the opening in the bathtub wall, thereby preventing water in the bathtub from conveying through the air jet when the source of pressurized air is not in use. The outlet end comprises a flange provided on a downstream side thereof with recesses for receiving an adhesive for securing the flange to the hidden surface of the bathtub wall. The flange comprises an annular seat disposed around an inner wall of the hollow body and blades extending radially outwardly from the annular seat with the recesses extending between the blades and outwardly of the annular seat. The blades and the annular seat contact the hidden surface. The flange also defines a number of holes between the blades for introducing the adhesive in the recesses from an upstream side of the flange. The air jet is connected to an air distribution piping of the air massage system, for instance using fitting. The air jet further comprises an annular seal sandwiched between the upstream side of the flange and a further flange provided at a downstream end of the fitting.

HIDDEN AIR JET WITH UNIDIRECTIONAL FLOW MECHANISM AND AIR MASSAGE SYSTEM INCLUDING AT LEAST ONE OF THESE JETS

BACKGROUND OF THE INVENTION

5 1. Field of the Invention

The present invention relates to air jets for bathtub air massage systems and, more particularly, to a new air jet adapted to increase hygienic conditions in the massage system's piping located upstream of the air 10 jet.

2. Description of the Prior Art

The Channel system, e.g. as in the Ultra™ bathtub, consists in surrounding a bathtub with a fiberglass air cavity. Thirty to ninety holes of more or 15 less 1/8" in diameter are defined through the bathtub. Air is propelled in the cavity by a blower and then escapes through each hole to create turbulence in the water.

Even though the air distribution system is 20 hidden, water infiltrates the air cavity once the blower is turned off. In addition to this problem, the air cavity is also hermetically closed and is hard to reach under the bathtub, making this system difficult to clean and consequently not very hygienic. Also, holes are a 25 very basic means to blow air. The fact that the thickness of the bathtub wall is thin does not allow for the pressurized air to pick up much velocity and a direction.

Also known is the Ultra-Jet™ system that comprises air jets connected by a solid piping network, 30 and that is connected to the drain of the bathtub. The jets allow for an improved flow of air as they are connected to pipes and as they form tubes. This allows for a flow of air in a direction with an increased velocity in comparison with the previous system. In this 35 system, the water infiltrates the piping network through

the jets when the system is not operating. When the user opens the drain to empty the bathtub, a valve is automatically opened to drain the piping network.

In addition to the improvement over the Channel 5 system regarding the flow of air, the draining of the piping network from the stagnant water provides an improvement in hygiene. However, the network is still in contact with the soiled water. Also, the Ultra-Jet™ 10 system is not as discreet as the Channel system as jets fill the surface of the bathtub. These jets are protuberant, and may consequently be uncomfortable and in 15 the way.

Applicant of the present Application has also developed an air massage system for bathtubs which 15 includes a unidirectional flow mechanism, also referred to as a check valve, to its air jets. This feature ensures the piping network is dry throughout the operation of the system and, once the system is shut off, provides a real improvement over the existing systems 20 with respect to hygiene. However, the air jets protrude on the surface of the bathtub.

SUMMARY OF THE INVENTION

It is therefore an aim of the present invention 25 to provide an air jet, e.g. for bathtub air massage systems, that is discreet in visibility.

It is a further aim of the present invention to provide an air jet maintaining a high level of hygiene in the pressurized air piping located upstream thereof.

30 Therefore, in accordance with the present invention, there is provided an air jet for an air massage system for use with a bathtub having a wall defining opposite visible and hidden surfaces, at least one opening being defined through the wall, comprising a 35 hollow body having inlet and outlet ends and a

unidirectional flow device disposed therebetween, said outlet end being adapted to be mounted to the hidden surface of the wall of the bathtub opposite the opening, said inlet end being adapted to be in fluid communication
5 with a source of pressurized air, said unidirectional flow device being disposed for allowing air therethrough only in a direction from said inlet to said outlet end and then through the opening in the wall of the bathtub, thereby preventing water in the bathtub from conveying
10 through said air jet when pressurized air is not fed to said air jet.

Also in accordance with the present invention, there is provided an air massage system adapted to be mounted behind a bathtub having wall defining opposite visible and hidden surfaces, at least one opening being defined through the wall, said air massage system comprising:
15

a source of pressurized air;
an air distribution system for conveying pressurized air from said source of pressurized air to at least one air jet;
said air jet comprising a hollow body having inlet and outlet ends and a unidirectional flow device disposed therebetween, said outlet end being adapted to be mounted to the hidden surface of the wall of the bathtub opposite
25 the opening, said unidirectional flow device being disposed for allowing air therethrough only in a direction from said inlet to said outlet end and then through the opening in the wall of the bathtub, thereby preventing water in the bathtub from conveying through
30 said air jet when pressurized air is not fed to said air jet.

Still in accordance with the present invention, there is provided an air massage system in combination with a bathtub having wall defining opposite visible and
35 hidden surfaces, at least one opening being defined

through said wall, said air massage system being provided behind said wall and comprising:

a source of pressurized air;

an air distribution system for conveying pressurized
5 air from said source of pressurized air to at least one
air jet;

said air jet comprising a hollow body having inlet and
outlet ends and a unidirectional flow device disposed
therebetween, said outlet end being mounted to said
10 hidden surface of said wall of said bathtub opposite said
opening, said unidirectional flow device being disposed
for allowing air therethrough only in a direction from
said inlet to said outlet end and then through said
opening in said wall of said bathtub, thereby preventing
15 water in said bathtub from conveying through said air jet
when pressurized air is not fed to said air jet.

BRIEF DESCRIPTION OF THE DRAWINGS

Having thus generally described the nature of
20 the invention, reference will now be made to the
accompanying drawings, showing by way of illustration a
preferred embodiment thereof, and in which:

Fig. 1 is a cross-sectional elevational view of
a hidden air jet in accordance with the present
25 invention;

Fig. 2 is a perspective view of the hidden air
jet of Fig. 1; ;

Fig. 3 is a schematic perspective view of an
air massage system with sequencer and provided with a
30 plurality of air jets of the present invention;

Fig. 4 is a schematic perspective view of an
air massage system with a vortex system and provided with
a plurality of air jets of the present invention;

Fig. 5 is a schematic perspective view of a Channel air massage system provided with a plurality of air jets of the present invention; and

5 Fig 5A is a schematic vertical cross-sectional view of a bottom corner section of the bathtub and associated air distribution components.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to Figs. 1 and 2, a hidden air jet J
 10 in accordance with the present invention is illustrated mounted against a hidden outer surface 18 of a bathtub B and to a fitting 2, such as an elbow (herein shown) or a Tee. The air jet J includes a jet body 1 that comprises an exteriorly threaded hollow tube 3 and an end flange 4.
 15 The flange 4 includes an annular seat 5 that extends around an inner wall 6 of the threaded hollow tube 3. The flange 4 is pierced with a number of holes 7 distributed equidistantly along the periphery of the flange 4. The flange 4 further includes a plurality of blades 8 extending radially from an outer surface of the annular seat 5 and between the holes 7. A unidirectional flow mechanism 9 is provided within the hollow tube 3 and can take the form of any water non-return device.

The elbow fitting 2 comprises an interiorly
 25 tapped hollow tube 10, closed at an end 11. A flange 12 is provided at a distal outlet of the tapped hollow tube 10, opposed from closed end 11. The flange 12 defines an annular groove 13 upon which rests an annular seal 14. A proximal inlet 15 of the fitting 2 extends laterally from
 30 the tapped hollow tube 10, and comprises a number of successive and parallel exterior annular wedges 16.

The jet body 1 and the elbow fitting 2 are assembled by screwing the threaded hollow tube 3 of the jet body 1 with the tapped hollow tube 10 of the elbow
 35 fitting 2. The annular seal 14 ensures the sealing of

this assembly. A sealing adhesive is injected through the holes 7 and fills the substantially triangular recesses 17 formed between the blades 8, the annular seat 5 and the flange 4. The sealing adhesive bonds and seals the 5 flange 4 of the jet body 1 with the outer surface 18 of the bathtub B. The threaded hollow tube 3 is concentric with a hole 20 defined through a wall of the bathtub B, i.e. from a visible inner surface 21 thereof to the hidden surface 18 thereof.

10 A flexible pipe (such as pipes 30 in Fig. 3) is fitted over the inlet 15. The annular wedges 16 stretches the flexible pipe diametrically outwardly to provide a sealed fit between the flexible pipe and the inlet 15.

15 With the flexible pipe fitted over the inlet 15 of the tapped hollow tube 10, the tapped hollow tube 10 and the threaded hollow tube 3 joined tightly, and the flange 4 of the jet body 1 bonded to the outer surface 18 of the bathtub B (with the threaded hollow tube 3 concentric with the hole 20), the hidden air jet J is 20 ready for operation.

25 Air is blown through the flexible pipe and enters the hidden air jet J by the inlet 15. It fills the tapped hollow tube 10 and builds sufficient pressure to open and flow through the unidirectional flow mechanism 9. Then, it exits in the bathtub B through the hole 20 and creates a turbulence in the water filling the bathtub B.

30 The present air jet J can be used in a variety of bathtubs where turbulence is desired in the bathtub water. For instance, Fig. 3 illustrates a bathtub 100 embodying an air massage system which includes a blower 102 (which may enclose a heating element), a flexible or rigid main piping 104 connecting the blower 102 to a manifold 106, a sequencer 108, an electronic controller 35 110 and a series of rigid or flexible branch pipes, such

as the aforementioned flexible pipe 30. A number of holes 20 are defined through the wall of the bathtub 100 and an air jet J is mounted to the hidden surface 18 of the bathtub 100 opposite each hole 20. The use of flexible or 5 rigid branch pipes provides the present invention with versatility in the disposition, distribution and quantity of jets during installation.

In Fig. 4, there is shown a bathtub 200 provided with an air massaging system and a vortex 10 system, the air massaging system being provided with a series of air jets J. The bathtub 200 includes, as for the bathtub 100 of Fig. 3, a blower 202, a main piping 204 connecting the blower 202 to a manifold 206, an electronic controller 208 and a series of distribution 15 pipes 30 onto which are mounted the air jets J, as described hereinbefore in Figs. 1 and 3.

In Fig. 5, a further bathtub 300 is illustrated of the Channel-type while incorporating concealed air jets J. The bathtub 300 includes a blower 302, a main 20 piping 304 connecting the blower 302 to a manifold 306 which itself is connected to the distribution pipes 30 onto which are mounted the air jets J. In Fig. 5A, a channel 310 is shown for conveying air through holes 312 defined along the channel 310 which extends peripherally 25 around a bottom corner of the bathtub 300. At the bottom of the bathtub 300, various holes 20 are defined which are in communication with the air jets J and with the flexible pipes 30. The blower 302 is activated by an electronic controller 314. A variation of the Channel- 30 type bathtub replaces the channel 310 by a cavity substantially extending along the hidden outer surface 18 of the bathtub, thereby defining a plenum which in fact extends across the complete bottom of the bathtub and also possibly behind the side wall thereof. Similarly, 35 the plenum conveys air through holes 312.

When the air jet J is used in a Channel-type bathtub, the hidden air jets J are disposed within the channel 310 or the plenum of the bathtub 300 and are bonded to the hidden outer surface 18 of the bathtub 300,
5 whereby it is possible to remove the flexible pipes 30 and the elbow fittings 2, with the hidden air jets being simply fed with pressurized air contained in the channel or plenum while still preventing the infiltration of bathtub water in the channel 310.

10 In all of the above bathtubs 100, 200 and 300, the air massaging system is completely hidden by way of the use of the air jets J of the present invention which only leaves the holes 20 of this air massaging system to be visible. Any air massage system combining any of the
15 features of bathtubs 100, 200 and 300 can benefit from using the present air jet J.

The jet J of the present invention is qualified as being hidden. With the bonding and sealing means described above, the only visible parts of the system
20 from the inner surface 21 of the bathtubs B, 100, 200 and 300 are the holes 20.

The unidirectional flow mechanism 9 allows for the free release of air in the bathtub B. Once the air pressure in the flexible pipes is reduced, upon the end
25 of operation of the system for example, the unidirectional flow mechanism 9 closes, thereby preventing the bathtub water from entering in the flexible pipes and so causing, e.g. by its stagnation, a contamination of the flexible pipes and the remaining
30 piping network of the air massage system. As air is the sole fluid in contact with the flexible pipes and with the piping network of the air massage system, the hidden air jet ensures a high hygiene level.

The unidirectional flow mechanism 9 may have
35 different configurations. It can be a check valve with a

spring-loaded piston and/or one (or more) spring-loaded plastic, stainless steel, glass or rubber ball, with a rubber flap or flaps from another material, a magnetic valve, a flexible diaphragm, a combination of the above 5 enumeration and/or any other unidirectional flow mechanism to ensure the water-tightness of the air jet J.

Also, the elbow fitting 2 can be replaced by a Tee fitting, or other. This configuration increases the flow of incoming air through the inlet of the hidden air 10 jet J, and consequently, the turbulence in the bathtub B.

I CLAIM:

1. An air jet for an air massage system for use with a bathtub having a wall defining opposite visible and hidden surfaces, at least one opening being defined through the wall, comprising a hollow body having inlet and outlet ends and a unidirectional flow device disposed therebetween, said outlet end being adapted to be mounted to the hidden surface of the wall of the bathtub opposite the opening, said inlet end being adapted to be in fluid communication with a source of pressurized air, said unidirectional flow device being disposed for allowing air therethrough only in a direction from said inlet to said outlet end and then through the opening in the wall of the bathtub, thereby preventing water in the bathtub from conveying through said air jet when pressurized air is not fed to said air jet.
2. The air jet for an air massage system as defined in claim 1, wherein said outlet end comprises a flange adapted to be mounted to the hidden surface.
3. The air jet for an air massage system as defined in claim 2, wherein said flange on a downstream side thereof defines recesses for receiving an adhesive for securing said flange to the hidden surface of the wall of the bathtub.
4. The air jet for an air massage system as defined in claim 3, wherein said flange comprises an annular seat disposed around an inner wall of said hollow body and blades extending radially outwardly from said annular seat, said recesses extending between said blades and outwardly of said annular seat, said blades and said annular seat being adapted to contact the hidden surface..

5. The air jet for an air massage system as defined in
claim 4, wherein said flange defines a number of holes
between said blades for introducing said adhesive in said
5 recesses from an upstream side of said flange.

6. The air jet for an air massage system as defined in
claim 1, wherein said hollow body defines an exterior
thread adapted to be connected to an air distribution
10 piping of the air massage system.

7. The air jet for an air massage system as defined in
claim 6, wherein said exterior thread is adapted to be
threadably connected to a fitting of the air distribution
15 piping of the air massage system.

8. The air jet for an air massage system as defined in
claim 7, further comprising an annular seal adapted to be
sandwiched between an upstream side of a flange provided
20 at said outlet end of said hollow body and a further
flange provided at a downstream end of the fitting.

9. The air jet for an air massage system as defined in
claim 1, wherein the unidirectional flow device comprises
25 at least one of a spring-loaded piston, a spring-loaded
ball, a flap, a magnetic valve and a flexible diaphragm.

10. An air massage system adapted to be mounted behind a
bathtub having wall defining opposite visible and hidden
30 surfaces, at least one opening being defined through the
wall, said air massage system comprising:
a source of pressurized air;
an air distribution system for conveying pressurized
air from said source of pressurized air to at least one
35 air jet;

said air jet comprising a hollow body having inlet and outlet ends and a unidirectional flow device disposed therebetween, said outlet end being adapted to be mounted to the hidden surface of the wall of the bathtub opposite
5 the opening, said unidirectional flow device being disposed for allowing air therethrough only in a direction from said inlet to said outlet end and then through the opening in the wall of the bathtub, thereby preventing water in the bathtub from conveying through
10 said air jet when pressurized air is not fed to said air jet.

11. The air massage system as defined in claim 10,
wherein said outlet end of said air jet comprises a
15 flange adapted to be mounted to the hidden surface.

12. The air massage system as defined in claim 11,
wherein said flange on a downstream side thereof defines recesses for receiving an adhesive and sealingly securing
20 said flange to the hidden surface of the wall of the bathtub.

13. The air massage system as defined in claim 12,
wherein said flange comprises an annular seat disposed
25 around an inner wall of said hollow body and blades extending radially outwardly from said annular seat, said recesses extending between said blades and outwardly of said annular seat, said blades and said annular seat being adapted to contact the hidden surface.
30

14. The air massage system as defined in claim 13,
wherein said flange of said air jet defines a number of holes between said blades for introducing said adhesive in said recesses from an upstream side of said flange.

15. The air massage system as defined in claim 10,
wherein said air distribution system comprises at least
one pipe for connecting in fluid communication said
source of pressurized air to said air jet, at least a
5 section of said pipe of said air distribution system
connected to said air jet being flexible.

16. The air massage system as defined in claim 15,
wherein said hollow body defines an exterior thread
10 adapted to be connected to said pipe of said air
distribution system.

17. The air massage system as defined in claim 16,
wherein said air distribution system comprises a fitting
15 adapted to be connected in fluid communication with said
exterior thread of said air jet.

18. The air massage system as defined in claim 17,
wherein said air jet comprises an annular seal adapted to
20 be sandwiched between an upstream side of a flange
provided at said outlet end of said hollow body and a
further flange provided at a downstream end of said
fitting.

25 19. An air massage system in combination with a bathtub
having wall defining opposite visible and hidden
surfaces, at least one opening being defined through said
wall, said air massage system being provided behind said
wall and comprising:
30 a source of pressurized air;
 an air distribution system for conveying pressurized
 air from said source of pressurized air to at least one
 air jet;
 said air jet comprising a hollow body having inlet and
35 outlet ends and a unidirectional flow device disposed

therebetween, said outlet end being mounted to said hidden surface of said wall of said bathtub opposite said opening, said unidirectional flow device being disposed for allowing air therethrough only in a direction from 5 said inlet to said outlet end and then through said opening in said wall of said bathtub, thereby preventing water in said bathtub from conveying through said air jet when pressurized air is not fed to said air jet.

10 20. The combination as defined in claim 19, wherein said outlet end of said air jet comprises a flange mounted to said hidden surface.

15 21. The combination as defined in claim 20, wherein said flange on a downstream side thereof defines recesses having an adhesive therein sealingly securing said flange to said hidden surface of said wall of said bathtub.

20 22. The combination as defined in claim 21, wherein said flange comprises an annular seat disposed around an inner wall of said hollow body and blades extending radially outwardly from said annular seat, said recesses extending between said blades and outwardly of said annular seat, said blades and said annular seat contacting said hidden 25 surface.

23. The combination as defined in claim 22, wherein said flange of said air jet defines a number of holes between said blades for introducing said adhesive in said 30 recesses from an upstream side of said flange.

24. The combination as defined in claim 19, wherein said air distribution system comprises at least one pipe connecting in fluid communication said source of 35 pressurized air to said air jet, at least a section of

said pipe of said air distribution system connected to said air jet being flexible.

25. The combination as defined in claim 24, wherein said
5 hollow body defines an exterior thread connected to said
pipe of said air distribution system.

26. The combination as defined in claim 25, wherein said
air distribution system comprises a fitting connected in
10 fluid communication with said exterior thread of said air
jet.

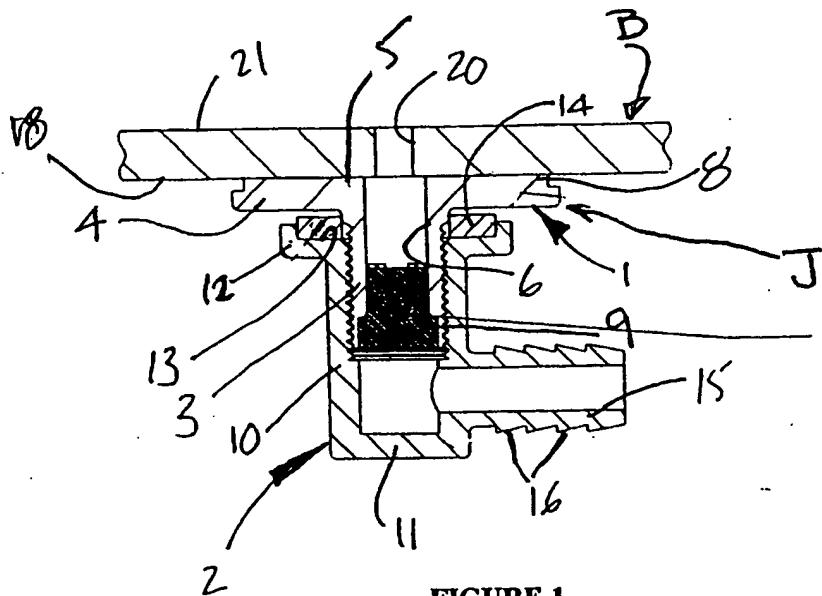
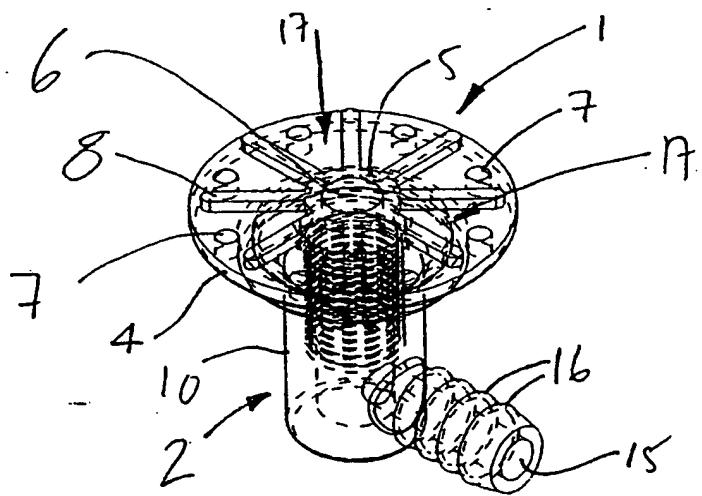
27. The combination as defined in claim 19, wherein said
air distribution system defines at least one channel
15 extending along said hidden surface of said wall of said
bathtub, thereby defining a passage for conveying air
from said source of pressurized air to said air jet.

28. The combination as defined in claim 19, wherein said
20 air distribution system comprises a plenum extending
along said hidden surface of said wall of said bathtub
for conveying air from said source of pressurized air to
said air jet.

25 29. The combination as defined in claim 19, wherein said
air massage system is used in combination with at least
one of a vortex system and a channel-type system.

ABSTRACT

An air jet of an air massage system used with a bathtub having a wall defining opposite visible and
5 hidden surfaces and defining a number of openings through the bathtub wall. The air jet comprises a hollow body having opposed inlet and outlet ends and a unidirectional flow device disposed therebetween. The outlet end is mounted directly to the hidden surface of the bathtub
10 wall opposite one of the openings. The inlet end is connected to a source of pressurized air. The unidirectional flow device allows pressurized air therethrough only in a direction from the inlet to the outlet end and then through the opening in the bathtub
15 wall, thereby preventing water in the bathtub from conveying through the air jet when the source of pressurized air is not in use. The outlet end comprises a flange provided on a downstream side thereof with recesses for receiving an adhesive for securing the
20 flange to the hidden surface of the bathtub wall. The flange comprises an annular seat disposed around an inner wall of the hollow body and blades extending radially outwardly from the annular seat with the recesses extending between the blades and outwardly of the annular
25 seat. The blades and the annular seat contact the hidden surface. The flange also defines a number of holes between the blades for introducing the adhesive in the recesses from an upstream side of the flange. The air jet is connected to an air distribution piping of the air
30 massage system, for instance using fitting. The air jet further comprises an annular seal sandwiched between the upstream side of the flange and a further flange provided at a downstream end of the fitting.

**FIGURE 1****FIGURE 2**

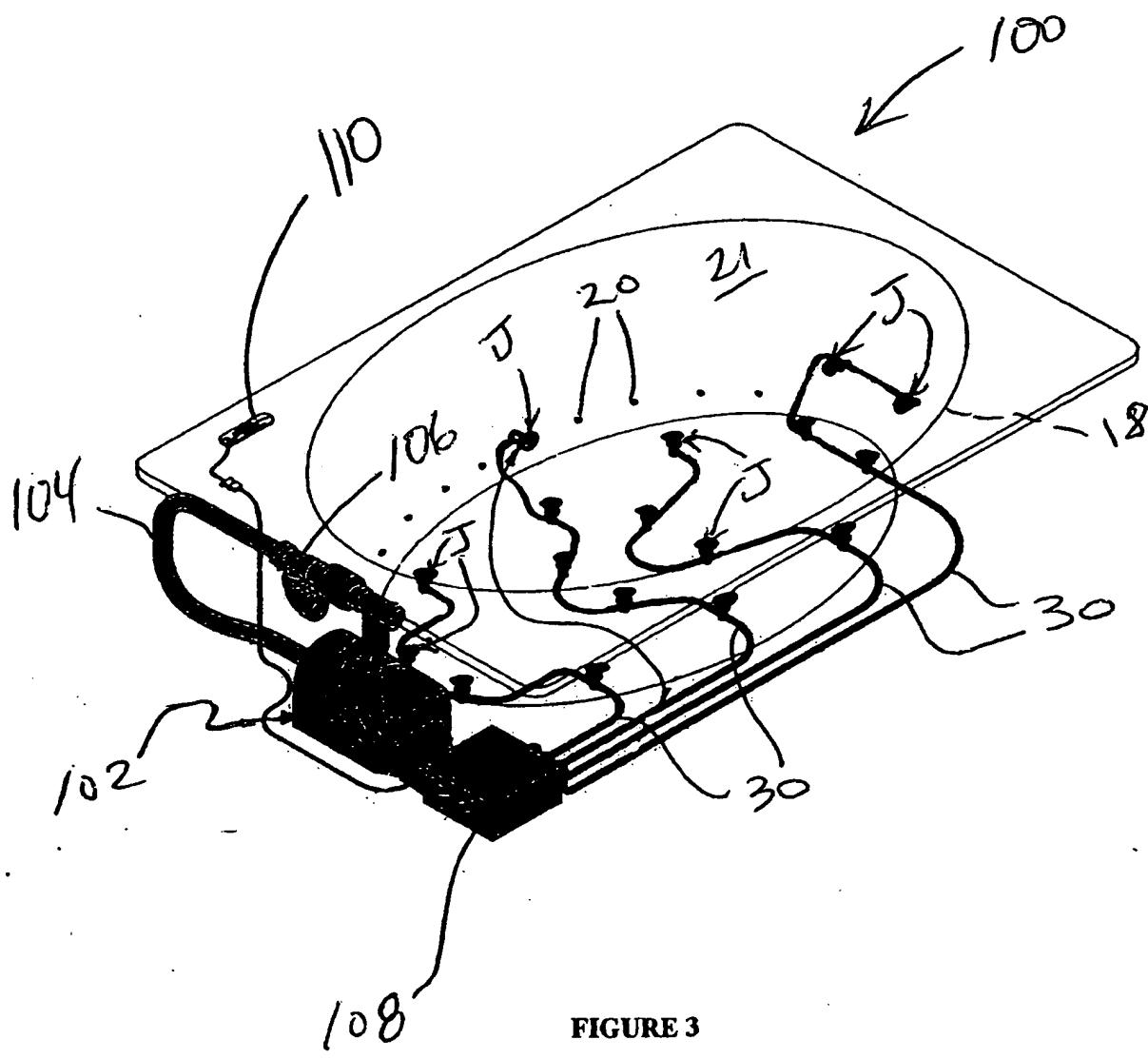


FIGURE 3

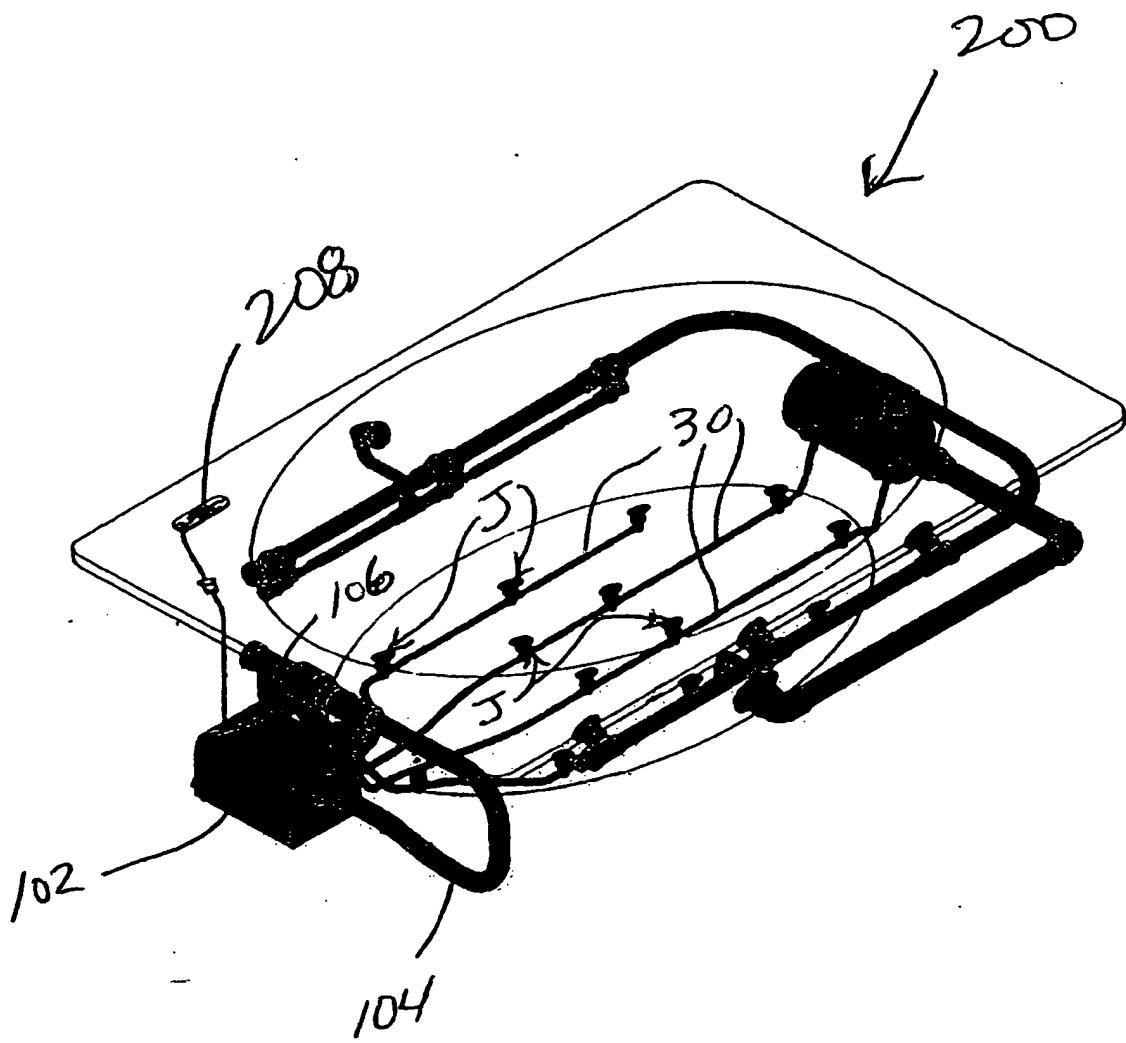


FIGURE 4

